SRINI SCIENCE MIND

10th CLASS

ENGLISH MEDIUM

New Pattern

SURE **10** GPA

Physical Science

ACADEMIC STANDARD WISE IMPORANT QUESTIONS

Question wise weightage table

S.No	Type of questions	Number of questions	Marks allotted	Total marks	percentage
1.	Objective questions	12	1/2	6	12
2.	Very short answer questions	8	1	8	16
3	Short answer question	8	2	16	24
4	Essay questions	5	4	20	40
	Total	33		50	100

1. Heat
2. Acids, Bases and Salts
3. Refraction of Light at Plane Surfaces
4. Refraction of Light at Curved Surfaces
5. Human Eye and Colourful world
6. Structure of Atom
7. Classification of Elements- The Periodic Table
8. Chemical Bonding
9. Electric Current
10. Electromagnetism
11. Principles of Metallurgy
12. Carbon and its Compounds

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Chapter-1(HEAT)

➢ **4 Marks Questions**

1. Write the difference between heat and temperature (AS1)

Ans:

Heat	Temperature
1.Heat is the energy that flows from a hotter body to a colder body	1.The degree of hotness or coldness of the object is known as temperature
2.It is denoted by 'Q'	2.It is denoted by 'T'
3.S.I unit is Joule	3. S.I unit is Kelvin
4. Q=mSΔT	4. K=C+273

2. Explain the procedure of finding specific heat of solid experimentally. (AS3)

Ans:

Aim: To find the specific heat of given solid

Material required: calorimeter, thermometer, stirrer, water, steam water, wooden box and lead shots (or) iron bolt

Procedure:

Step-1:

Mass of the calorimeter(m_1)=....

Temperature of the calorimeter(T_1)=..

Let specific heat of calorimeter = S_c

Step-2:

Now fill 1/3rd of the volume of calorimeter with water.

Mass of the calorimeter + water = m_2

Mass of the water= $m_2 - m_1$

Temperature of the water(T_1)=.....

Let specific heat of water= S_w

Step-3:

Take a few lead shots and place them in hot water or steam water.

Temperature of the lead shots(T_2)=..

Let specific heat of lead shots = S_l

Step-4:

Transfer the hot lead shots quickly into the calorimeter.

Mass of the calorimeter + water + lead shots = m_3

Mass of lead shots = m_3-m_2

After some time

Temperature of calorimeter+ water+ lead shots = T_3

According to Principle of method of mixtures

Heat lost by the solid (lead shots) = Heat gain by the calorimeter + Heat gain by the water

$$(m_3 - m_2)\, S_l (T_2 - T_3) = m_1 S_c (T_3 - T_1) + (m_2 - m_1)\, S_w (T_3 - T_1)$$

$$S_l = \frac{[m_1 S_c + (m_2 - m_1) S_w]\,(T_3 - T_1)}{(m_3 - m_2)(T_2 - T_3)}$$

3. Observe the table and answer the following questions (AS4)

Substance	Specific heat	
	In cal/g-°C	In J/kg-K
Lead	0.031	130
Mercury	0.033	139
Brass	0.092	380
Zinc	0.093	391
Copper	0.095	399
Iron	0.115	483
Glass(flint)	0.12	504
Aluminum	0.21	882
Kerosene oil	0.50	2100
Ice	0.50	2100
Water	1	4180
Sea water	0.95	3900

a) What is the SI unit of Specific heat?
Ans: J/kg-K
b) Which metal is best for cooking utensils? Why?
Ans: Copper, lowest specific heat value
c) Which metal is slowly heated up among all given substance?
Ans: Aluminum
d) How much heat energy is required to rise 1^0 C of water of 1 gram?
Ans: 1 cal
e) Which metal is used to soldering the wires? Why?
Ans: Lead. Least specific heat value
f) Why different substances have different specific heats?
Ans: Specific heat is depends on the nature of the substance
g) Write the formula of specific heat of the substance?
Ans: $S = \frac{Q}{m\Delta T}$
h) Convert 1 cal/g- ^{0}C into J/kg-J
Ans: 1 cal/g- ^{0}C = 4.186×10^{-3} J/kg-J
i) Which liquid used as coolant? Why?
Ans: Water. It has highest specific heat value

4. What are the applications of specific heat ?(AS6)

Ans: Applications of Specific heat capacity

1. The sun delivers a large amount of energy to the Earth daily. The water sources on Earth, particularly the oceans, absorb this energy for maintaining a relatively constant temperature. The oceans behave like heat "store houses" for the earth. They can absorb large amounts of heat at the equator without appreciable rise in temperature due to high specific heat of water.
2. Water melon brought out from the refrigerator retains its coolness for a longer time than any other fruit because it contains a large percentage of water.Water has greater specific heat
3. A samosa appears to be cool outside but it is hot when we eat it because the curry inside the samosa contains ingredients with higher specific heats.

5. How do you prove average kinetic energy of molecules is directly proportional to the absolute temperature? (AS3)

Ans: i) Take two bowls one with hot water and second with cold water. Gently sprinkle food colour on the surface of the water in both bowls.
ii) Observe the motion of the small grains of food colour.
iii) You will notice that the grains of food colour jiggle (move randomly).
iv) We observe that the jiggling of the grains of food colour in hot water is more when compared to the jiggling in cold water.
v) Thus we conclude that the average kinetic energy of molecules /particles of a hotter body is greater than that of a colder body.
vi) The average kinetic energy of the molecules is directly proportional to the absolute temperature

6. Derive Q=msΔT (AS1)

Ans: For same change in temperature the amount of heat (Q) absorbed by a substance is directly proportional to its mass (m)

$Q \alpha m$ ------> 1 (when ΔT is constant)

For the same mass (m) of water the change in temperature is proportional to amount of heat (Q) absorbed by it.

$Q \alpha \Delta T$------> 2 (when 'm' is constant)

From equation (1) and (2), we get

$Q \alpha m\Delta T$

$Q = mS\Delta T$

- **2 Marks Questions**

1. Define specific heat and write its units. (AS1)

Ans: The amount of heat required to raise the temperature of unit mass of the substance

by1^{0}C
S.I unit of specific heat is J/kg-K
C.G.S unit of specific heat is cal/g-^{0}C

2. Write the formula of specific heat and explain the terms in it (AS1)

Ans: $S = \frac{Q}{m\Delta T}$

S= Specific heat, Q=Heat, m= Mass of the substance, ΔT=Raise in temperature

3. How do you appreciate the role of the higher specific heat of water in stabilizing atmospheric temperature during winter and summer seasons? (AS6)

Ans: The sun delivers a large amount of energy to the Earth daily. The water sources on Earth, particularly the oceans, absorb this energy for maintaining a relatively constant temperature. The oceans behave like heat "store houses" for the earth. They can absorb large amounts of heat at the equator without appreciable rise in temperature due to high specific heat of water..

4. What role does specific heat play in keeping a watermelon cool for a long time after Removing it from a fridge on a hot day? (AS6)

Ans: Water melon brought out from the refrigerator retains its coolness for a longer time than any other fruit because it contains a large percentage of water.Water has greater specific heat

5. Convert the following temperatures into Kelvin scale (AS1)

A) 27^0 C B) 135^0 C

Ans: A) C=27^0 C B) C=135^0 C

K=C+273= 27+273=300K K=C+273= 135+273=408K

- **1 Mark Questions**

1. Define temperature (AS1)

Ans: The degree of hotness or coldness of the object is known as temperature

2. State the principle of method of mixtures.(AS1)

Ans: Net heat lost = Net heat gain

3. Why does transfer of heat energy take place between objects (system)? (AS2)

Ans: To obtain thermal equilibrium

4. A samosa appears to be cool outside but it is hot when we eat why? (AS2)

Ans: The curry inside the samosa contains ingredients with higher specific heats

5. What is calorie ? (AS1)

Ans: The amount of heat required to raise the temperature of 1 gm of water by 1^{0}C is called calorie

- **½ Mark Questions**

1. SI unit of heat is ____

Ans: joule(J)

2. 1 cal = _____ joule

Ans: 4.186

3. Which device you select to measure the specific heat of a solid in the laboratory?

Ans: Calorimeter

4. If the temperature of a steel rod is 330K, then its temperature in ^{0}C is_____

A) 55^{0}C B) 57^{0}C C) 59^{0}C D) 53^{0}C

Ans: 57^{0}C

5. What is the S.I unit of specific heat?

Ans: J/kg-K

6. If initial temperatures of the two samples of masses m1 and m2 be T1 and T2, then what is the final temperature of the mixture (T) is ____

Ans: T = $(m_1T_1+m_2T_2)/(m_1+m_2)$

7. The oceans behaves like heat _____ for earth

Ans: Store houses

Chapter-2 (ACIDS,BASES & SALTS)

- **4 Marks Questions**

1. Why does tooth decay start when the pH of mouth is lower than 5.5? (AS1)

Ans: i) Tooth decay starts when the pH of the mouth is lower than 5.5.

ii)Tooth enamel, made of calcium phosphate is the hardest substance in the body.

iii) But is corroded when the pH in the mouth is below 5.5.
iv) Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth.
v) The best way to prevent this is to clean the mouth after eating food. Using tooth pastes, which are generally basic neutralize the excess acid and prevent tooth decay.

2. Compounds such as alcohols and glucose contain hydrogen but are not categorized as acids. Describe an activity to prove it.(AS3)

Ans: 1) Prepare solutions of glucose, alcohol, hydrochloric acid and sulphuric acid etc.,
2) Connect two different coloured electrical wires to graphite rods separately in a 100 ml beaker as shown in figure.
3) Connect free ends of the wire to 230 volts AC plug and complete the circuit as shown in the fig by connecting a bulb to one of the wires.
4) Now pour some dilute HCl in the beaker and switch on the current.
5) We observe that the bulb glows.
6) Repeat activity with dilute sulphuric acid and glucose and alcohol solutions separately.
7) You will notice that the bulb glows only in acid solutions but not in glucose and alcohol solutions.
8) Glowing of bulb indicates that there is flow of electric current through the solution. Acid solutions have ions and the moment of these ions in solution helps for flow of electric current through the solution.

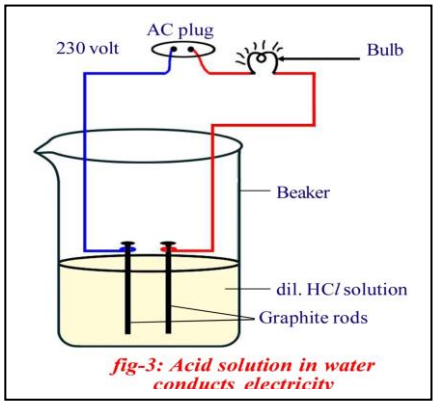


fig-3: Acid solution in water conducts electricity

9) The positive ion (cation) present in HCl solution is H+. This suggests that acids produce hydrogen ions H+ in solution, which are responsible for their acidic properties.
10) In glucose and alcohol solution the bulb did not glow indicating the absence of H+ ions in these solutions. The acidity of acids is attributed to the H+ ions produced by them in solutions.

3. Show that acids produce hydrogen gas when react with metals (AS3)

Ans:

Aim: To show that acid produce hydrogen gas reacted with metals.

Materials required: test tube, delivery tube, glass trough, candle, soap water, dil. HCl, and zinc granules.

Procedure:
1)Set the apparatus as shown in figure.
2)Take about 10ml of dilute HCl in a test tube and add a few zinc granules to it.
3) We observe a gas is evolved from the zinc granules
4)Pass the gas being evolved through the soap water.
5)We observe some bubbles formed in the soap solution.
6)Bring a burning candle near the gas filled bubble.
7) The candle turn off with a pop sound
8) The pop sound indicates that the gas evolved in H2
Acid + Metal → Salt + Hydrogen
2 HCl (aq) + Zn(s) → $Zn Cl_2$ (aq) + H_2 (g)
9) Repeat this experiment with remaining acids

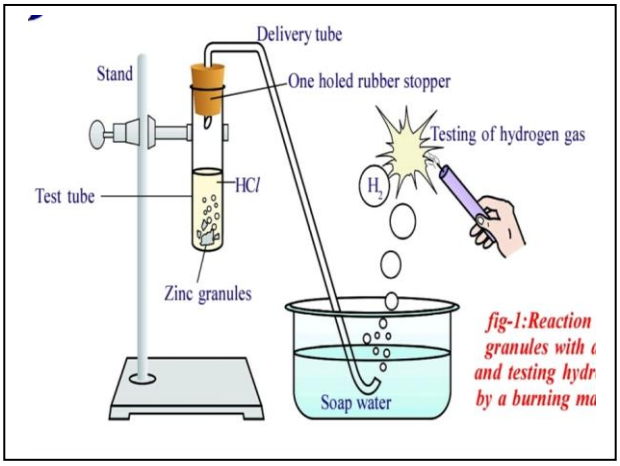


fig-1:Reaction granules with and testing hydr by a burning ma

Conclusion: We conclude that hydrogen gas is produced when acid reacts with metals.

4. Observe the table and answer the following questions (AS4)

Liquid/Solution	pH
P	7
Q	6
R	11
S	2
T	8

a) Which solution(s) turn into pink by adding phenolphthalein ?
Ans: R
b) Which solution(s) turn into red by adding methyl orange?
Ans: Q,S
c) Which is strong acid?

Ans: S

d) Which one indicates pure water?

Ans: P

e) If P^H=7,then find the $[H]^+$

Ans: 10^{-7}

f) Which solutions are acidic solutions?

Ans: Q,S

g) Which colour given by solution Q with universal indicator?

Ans: Red

h) Which colour gives by blue litmus paper when it is dipped in solution S?

Ans: Red

5. Complete the following table (AS4)

S.NO	Sample solution	Red litmus paper	Blue litmus paper	Phenolphthalein solution	Methyl orange solution
1	HCl				
2	NaOH				

Ans:

S.NO	Sample solution	Red litmus paper	Blue litmus paper	Phenolphthalein solution	Methyl orange solution
1	HCl	No change	Red	No change	Red
2	NaOH	Blue	No change	Pink	Yellow

6. Draw a neat diagram showing acid solution in water conducts electricity. (AS5)

Ans:

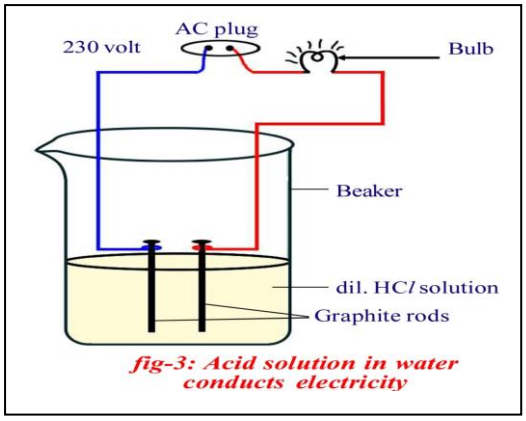


fig-3: Acid solution in water conducts electricity

7. Write an activity of reaction of acids with metal carbonates are hydrogen carbonates with diagram (AS3)

Ans: Procedure:

1) Take two test tubes; label them as A and B.
2) Take about 0.5 gm of sodium carbonate (Na2CO3) in test tube A and about 0.5 gm of sodium hydrogen carbonate ($NaHCO_3$) in test tube B.
3) Add about 2 ml of dilute HCl to both the test tubes.
4) Pass the gas produced in each case through lime water (calcium hydroxide solution) and record your observations
5) The reactions occurring in the above activities are as follows:

Na_2CO_3 (S) + 2 HCl (aq) → 2 NaCl (aq) + H_2O (*l*) + CO_2 (g)

$NaHCO_2$ (S) + HCl (aq) → NaCl (aq) + H_2O (*l*) + CO_2 (g)

Pass the gas evolved through lime water.

$Ca(OH)_2$ (aq) + CO_2 (g) → $CaCO_3$ + H_2O (*l*)

(White precipitate)

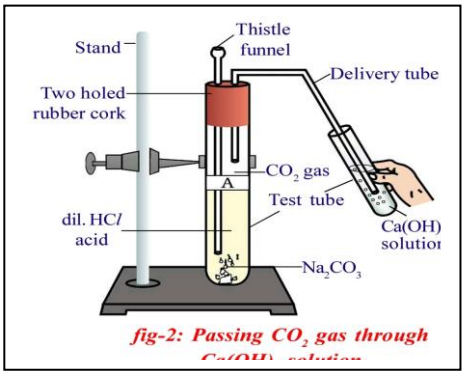


fig-2: Passing CO_2 gas through

On passing excess carbon dioxide the following reaction takes places:

$CaCO_3$ (S) + H_2O (*l*) + CO_2 (g) → $Ca(HCO_3)_2$ (aq)

Conclusion: The reaction of metal carbonates and hydrogen carbonates with acids give a corresponding salt,carbon dioxide and water.

8. What are the applications of p^H in daily life (AS6)

1. Plants and animals has sensitive p^H values

i)When pH of rain water is less than 5.6, it is called acid rain.
ii)When acid rain flows in to the rivers, it lowers the pH of the river water, the survival of aquatic life in such rivers becomes difficult.

2. Tooth decay
i)Tooth decay starts when the pH of the mouth is lower than 5.5.
ii)Tooth enamel, made of calcium phosphate is the hardest substance in the body.
iii)But is corroded when the pH in the mouth is below 5.5.

3. p^H in our digestive system
i)During indigestion the stomach produces too much acid and this causes pain and irritation.
ii)To get rid of this pain, people use bases called antacids.

4. p^H of the soul
i)Plants require a specific pH range for their healthy growth.

- **2 Marks Questions**

1. What is a neutralization reaction? Give two examples. (AS1)

Ans: The reaction of an acid with a base to give a salt and water is known as a neutralization reaction.

Examples: 1) $NaOH + HCl \rightarrow NaCl + H_2O$
2) $Mg(OH)_2 + H_2SO_4 \rightarrow MgSO_4 + 2H_2O$

2. Why does not distilled water conduct electricity? (AS2)

Ans: In Distilled water, the concentration of both H_3O^+ and OH^- is same. Hence they do not form as ions, so distilled water can be treated as neutral solution. As there is no flow of ions, distilled water do not conduct electricity.

3. Why pure acetic acid does not conduct electricity? (AS2)

Ans: Pure acetic acid not containing the H^+ ions. As there is no flow of ions, pure acetic acid do not conduct electricity.

4. How does the flow of acid rain into a river make the survival of aquatic life in a river difficult? (AS6)

Ans:. When pH of rain water is less than 5.6, it is called acid rain. When acid rain flows in to the rivers, it lowers the pH of the river water, the survival of aquatic life in such rivers becomes difficult.

5. Explain p^H (AS1)

Ans: A scale for measuring hydrogen ion concentration in a solution is called p^H scale.
p^H values from 0 to 14
The p^H is an indication of concentration of H+.

p^H value	**0 to below 7**	**7**	**Above 7 to 14**
Nature of Solution	**Acidic**	**Neutral**	**Basic**

6. What is acidity? How do you decrease acidity? (AS1)

Ans: During indigestion the stomach produces too much acid and this causes pain and irretitaion. This is called acidity.
These antacids neutralize the excess acid in the stomach

7. A milkman adds a very small amount of baking soda fresh milk. Why does he shift the p^H of the fresh milk from 6 to slightly alkaline? (AS2)

Ans: When milkman adds a little baking soda to fresh milk to make it slightly alkaline. So the p^H of the fresh milk shits to 6. Thus the spoilage of milk can slow down

- **1 Mark Questions**

1. What happens when an acid or base is mixed with water? (AS1)

Ans: Decrease in the concentration of ions per unit volume

2. Why pure acetic acid does not turn blue litmus to Red? (AS2)

Ans: Pure acetic acid not containing the H^+ ions.So, it does not turn blue litmus to red

3. What is range of p^H scale? (AS1)

Ans: 0 to 14

- **½ Mark Questions**

1. The colour of phenolphthalein indicator in basic solution is _____

A) Yellow B) Green C) Pink D) Orange

Ans: C

2. Complete the following equation

Acid + Base → Salt + _____

Ans: Water

3. Which gas evolves when acids react with metals?

Ans: Hydrogen

4. What is the nature of non-metal oxides?

Ans: Acidic

5. Match the following

P) p^H of Acid rain ( ) X) Lower than 5.5

Q) p^H of Tooth decay ( ) Y) Less than 5.6

( ) Z) Greater than 5.6

Ans: P-Y, Q-X

6. If base dissolves in water it is called as [ ]

A) neutralization B) base C) acid D) alkali

Ans: D

7. Which gas evolves, when metal carbonate or metal hydrogen carbonate react with acids [ ]

A) Hydrogen B) Oxygen C) Nitrogen D) Carbon dioxide

Ans: D

8. Is the substance present in antacid tablet acidic or basic?

Ans: Basic

Chapter-3 (REFRACTION OF LIGHT AT PLANE SURFACES)

- **4 Marks Questions**

1. How do you verify experimentally that sin i /sin r is a constant? (AS3)

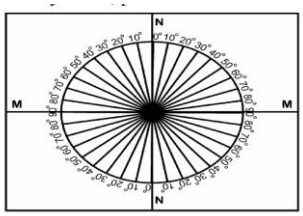
Ans:

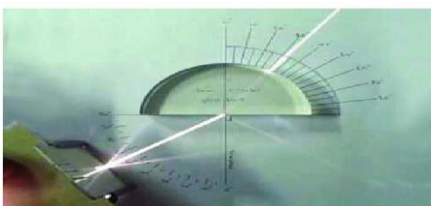
Aim: Obtaining a relation between angle of incidence and angle of refraction (or) experimentally prove that the angle of incidence is more than angle of refraction when light rays travel from rarer medium to denser medium (or) prove that Sin i/Sin r is constant

Materials required: Pro circle, scale, small black printed plank, a semi circular glass disc of Thickness nearly 2 cm, pencil and laser light

Preparation of Pro Circle: 1)Take a wooden plank which is covered with white chart

2) Draw two perpendicular lines, passing through the middle of the paper as shown in the figure
3) Let the intersecting point be O.
4) Mark one line as NN which is normal to the another line marked as MM
5) Here MM represents the line drawn along the interface of two media and NN represents the normal drawn to this line at O
6) Take a protractor and place it along NN in such a way that its centre coincides with O as shown in fig.
7) Then mark the angles from 0^0 to 90^0 on both sides of the line NN
8) Repeat the same on the other side of the line NN
9) The angles should be represented on circular line.





Procedure: 10) Now place a semi-circular glass disc so that its diameter coincides with the interface line (MM) and its center coincides with the point O

11)Take the laser light and send it along NN in such a way that the laser propagates from air to glass through the interface at point O and observe the way of laser light coming from other side of disc

12) There is no deviation
13) Send laser light along a line which makes 15 with NN and see that it must pass through point O
14) Measure its corresponding angle of refraction
15) Repeat this experiment with angles of 20^0,30^0 ,40^0,50^0 and 60^0, note the corresponding angles of refraction

i	r	sin i	sin r	sin i/sin r

From the above table we observe that sin i/sin r is constant
From the above table, we observe that i > r

2. Define the following terms (AS1)
A) Refractive index B) Laws of refraction

Ans: A) Refractive index (n) : The ratio of speed of light in vacuum to the speed of light in that medium. Also called as Absolute refractive index. It is property of the medium.
Units: No unit
Formula: n = C/V

B) Laws of refraction
1) The incident ray, the refracted ray and normal to interface of two transparent media at the point of incidence all lie in the same plane
2) During refraction, light follows Snell's law

3. Observe the following table and answer the questions (AS4)

Material medium	Refractive index	Material medium	Refractive index
Air	1.0003	Canada balsam	1.53
Ice	1.31	Rock salt	1.54
Water	1.33	Carbon Diasulphide	1.63
Kerosene	1.44	Dense flint glass	1.65
Fused quartz	1.46	Ruby	1.71
Turpentine oil	1.47	Sapphire	1.77
Crown glass	1.52	Diamond	2.42
Benzene	1.50		

a) Write the SI unit of Refractive index
Ans: No units
b)What happens to the speed of light when light is passing from Water to Rock salt
Ans: Decrease
c) Write the relation between speed of light(v) and refractive index of the material medium(n)
Ans: $n \alpha 1/v$ (OR) Inversely proportional to each other
d) What is the speed of light in Benzene?
Ans: $2x10^3$ m/s
e) What is reason, R.I of kerosene is more than the R.I of water?
Ans: Kerosene with high refractive is optically denser than water
f) Among Ice, Fused quartz, Ruby and Diamond, Which is rarer medium? Why?
Ans: Ice. Ice has lowest refractive insex
g) In the table, In which material medium speed of light is less? Why?
Ans: Diamond. It has high refractive index
h) Define refractive index
Ans: The ratio of speed of light in vacuum to the speed of light in that medium
i) Arrange the following materials medium based on the speed of the light
Diamond, Tarpentine oil, Flint glass, Air and Ice
Ans: Air, Ice, Turpentine oil, Flint glass and diamond
j) Whether the refracted ray bends towards normal or away from the normal when light ray travelled from Water to Kerosene

Ans: Bends towards normal

- **2 Marks Questions**

1. When we sit at camp fire, objects beyond the fire are seen swaying. Give reason for it. (AS6)
Ans: i) This happens due to refraction of light when it passes through hot to cold air.
ii) So, we observe the objects behind the fire seen swaying.
2. Why is it difficult to shoot a fish swimming in water? (AS1)
Ans: Due to refraction, the actual position of the fish is change. Fish and Observer are in two different mediums. The light ray travel from denser medium to rarer medium
3. On what factors does the refractive index of medium depend? (or) What are the factors that influence the refractive index (AS1)
Ans: 1) Nature of the material 2) Wavelength of light used 3) Temperature
4. In What cases does a light ray not deviate at the interface of two media? (AS6)
Ans: In two cases, light ray will not deviate at the interface of two media.
1) When light ray is incident normally.
2) When two media having same refractive indices.
5. The refractive index of glass is 3/2 then find speed of light in glass? (AS1)
Ans: Given $n_g=3/2$ $C=3x10^8$ m/s $V=?$
$n= C/V$
$V=C/n= \frac{3x108}{\frac{3}{2}} = 2x10^8$ m/s
6. What are the materials required to prove sin i/sin r (AS3)
Ans: Pro circle, scale, small black printed plank, a semi circular glass disc of thickness nearly 2 cm, pencil and laser light

- **1 Mark Questions**

1. What is refraction (AS1)
Ans: The process of changing speed at an interface when light travels from one medium to another resulting in a change in direction is refraction of light.
2. Why does ray of light bent when it travels from one medium to another (AS2)
Ans: Changing the speed of light
3. Refractive index of glass relative to water is 9/8. What is the refractive index of water relative to glass? (AS1)
Ans: Given $n_{gw} = 9/8$
$n_{wg} = 1/ n_{gw} = 8/9$
4. What is the cause of refraction of light? (AS1)
Ans: Changing the speed of light
5. What is relative refractive index ? (AS1)
Ans: Relative refractive index is defined as the refractive index of a medium with respect to another medium

- **½ Mark Questions**

1. X: Refractive index n=c/v
Y: Refractive index has no units
A) Both are correct B) X is correct, Y is wrong
C) X is wrong, Y is correct D) Both are wrong
Ans: A
2. Which of the following is Snell's law
A) $n_1 \sin i = \sin r/n_2$ B) $n_1/n_2 = \sin r/ \sin i$
C) $n_2/n_1 = \sin r/ \sin i$ D) $n_2 \sin i$ = constant
Ans: B
3. ASSERTION : It is difficult to shoot a fish swimming in water .
REASON : Due to refraction fish in water change its original position.
A) A –TRUE,R-FALSE B) A –FALSE,R-TRUE C) A –FALSE,R-FALSE D) A –TRUE,R-TRUE
Ans: D
4. When a light ray travel from denser to rarer medium along with the normal
a) It bends towards the normal b) It moves away from the normal c) It is an undeviated
Ans: b
5. What is the SI unit of refractive index?

A) m/s B) m/s^2 C)kg-m/s D) No unit

Ans: D

6. Write the value of the speed of light in vacuum

Ans: $3x10^8$ m/s

7.In which case Snell's law is not applicable?

Ans: Normal incidence

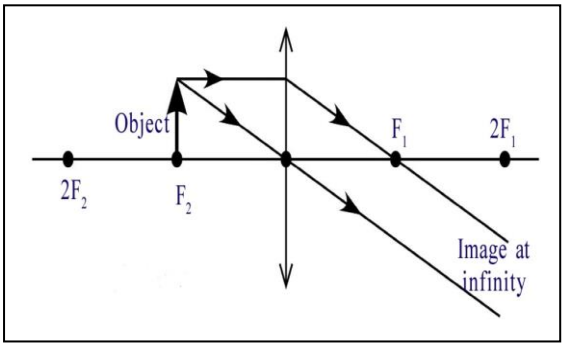
Chapter-4 (REFRACTION OF LIGHT AT CURVED SURFACES)

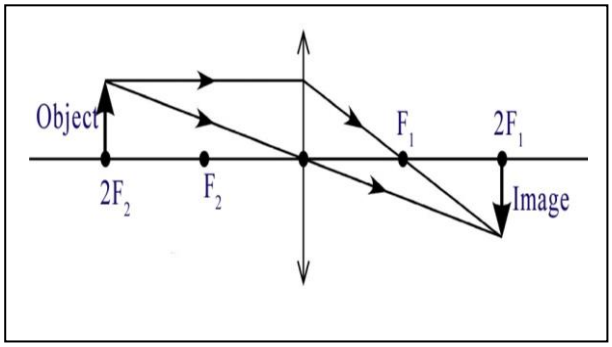
➢ 4 Marks Questions

1. Draw ray diagrams for the following positions of convex lens? (AS5)

A) Object is placed at F_2 B) Object is placed at $2F_2$ (practice remaining cases)

Ans: A) Object is placed at F_2 B) Object is placed at $2F_2$





2. Fill the following table, which is related to convex lens (AS4)

Position of the Object	Position of the Image	Real/Virtual image	Inverted/Erected image	Enlarged/Diminished image
Beyond 2F2			Inverted	Diminished
	Beyond 2F1	Real		Enlarged
At F_2	Infinity		Inverted	
	Same side of the Object		Erected	Enlarged

Ans:

Position of the Object	Position of the Image	Real/Virtual image	Inverted/Erected image	Enlarged/Diminished image
Beyond 2F2	Between F_1 and $2F_1$	Real	Inverted	Diminished
Between F_2 and $2F_2$	Beyond 2F1	Real	Inverted	Enlarged
At F_2	Infinity	Real	Inverted	Enlarged
Between O and F_2	Same side of the Object	Virtual	Erected	Enlarged

3. Draw various types of lenses (AS5)

Ans:

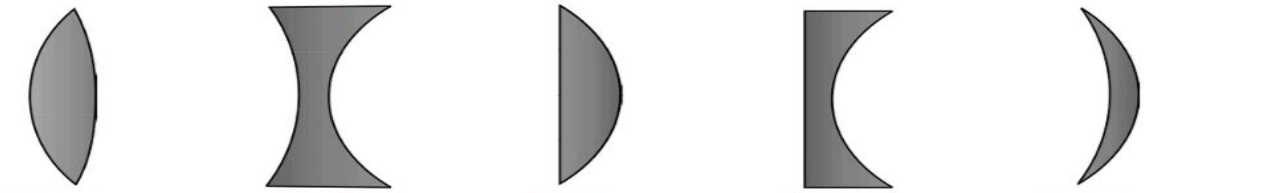


fig-6(a): Biconvex *fig-6(b): Biconcave* *fig-6(c): Plano-convex* *fig-6(d): Plano-concave* *fig-6(e): Concavo-convex*

4. Define the following (AS1)

A) Pole B) Focus C) Centre of curvature

D) Radius of curvature E) Principal axis F) Focal length

Ans: A) Pole(Optic centre): The midpoint of a thin lens is called optic centre of lens (P).

B) Focus The point of convergence (or) the point from which rays seem to emanate is called focal point or focus

C) Centre of curvature The centre of the sphere which contains the part of the curved surface is called centre of curvature.

D) Radius of curvature The distance between the centre of curvature and curved surface is called radius of curvature

E) Principal axis The line joining the points C_1 and C_2 is called principal axis.

F) Focal length The distance between the focal point and optic centre is called the focal length of lens

➢ **2 Marks Questions**

1. Frame any two questions to understand difference between convex lens and concave lens (AS2)

Ans: i) Which lens is called converging lens?
ii) Which lens is called diverging lens?
iii) Which lens are forms real and virtual images?
iv) Which lens are forms virtual images only ?
v) Which lens is thin at the middle and thicker at the edges?
vi) Which lens is thick at the middle and thin at the edge?

2. What is a lens? (AS1)

Ans: A lens is formed when a transparent material is bounded by two surfaces of which one (or) both surfaces are spherical. A lens is bounded by atleast one curved surface.

3. The Information given from the above figure, answer the following questions. (AS4)

i) Write the nature of the image?
ii) What is the lens shown in the figure?

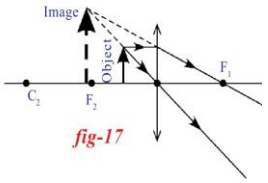


fig-17

Ans: i) Virtual, Erected and Enlarge image
ii) Convex lens

4. What are uses of lens? (AS1)

Ans: Used in microscopes, telescopes, binoculars, cinema projectors,cameras,magnifying lens

➢ **1 Mark Questions**

1. Write lens formula (AS1)

Ans: : $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

2. Write the behavior of a light ray when it is passing through the optic centre of a convex lens (AS2)

Ans: Undeviated

➢ **½ Mark Questions**

1. The midpoint of a thin lens is called _____

A) Centre of curvature B) Optic centre C) Focus D) Radius of curvature

Ans: B

2. Which one of the following materials cannot be used to make a lens?

A) water B) glass C) plastic D) clay

Ans: D

3. Which lens can form Real and Virtual image ?

Ans: Convex lens

4. P: Light ray passing along the principal axis is un deviated.
Q: Light ray passing through the focus is un deviated.

A)P,Q both are correct B)P is correct, Q is incorrect
C)P in correct, Q is correct D)P,Q both are incorrect

Ans: B

5. In which situation, the value of focal length of a convex lens is equal to the value of image distance

Ans: Infinite distance

6. Which lens is called converging lens?

Ans: Convex lens

7. What we call when a line joins the centre of curvature and the pole of a curved surfaces?

Ans: Principal axis

Chapter-5 (HUMAN EYE AND COLOURFUL WORLD)

- **4 Marks Questions**

1. How do you correct the eye defect Myopia?(AS1)

Ans: Some people cannot see objects at long distances but can see nearby objects clearly. This type of defect in vision is called "Myopia"

- It is also called "Near sightedness"
- If person with myopia ,his maximum focal length is less than 2.5 cm
- If person with myopia , form an image before the retina

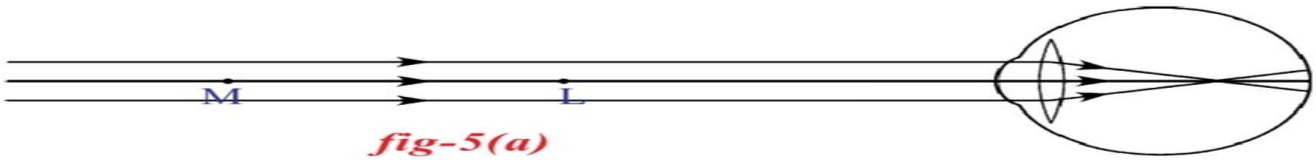


fig-5(a)

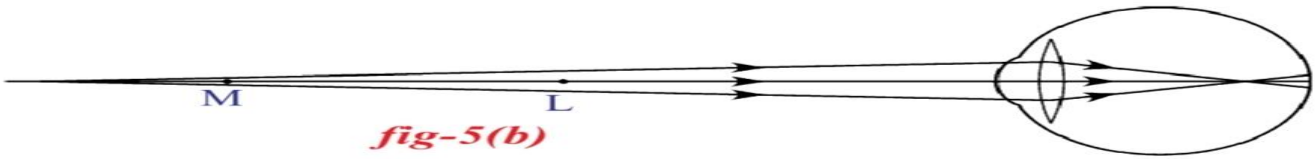


fig-5(b)

- The point of maximum distance at which the eye lens can form an image on the retina is called "far point(M)"
- A person with myopia can see objects clearly up to far point. After far point cannot see the objects clearly
- To correct this myopia by using bi-concave lens
- Focal length of bi-concave lens is f = -D

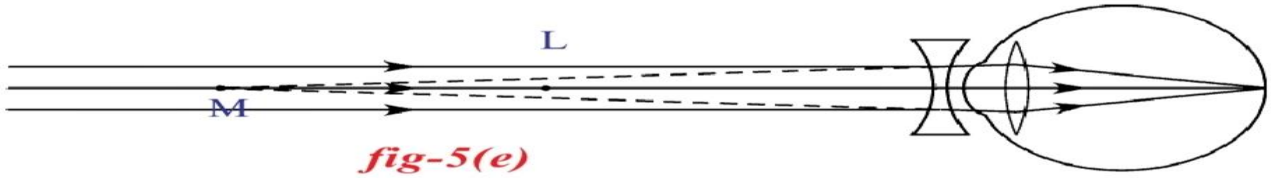
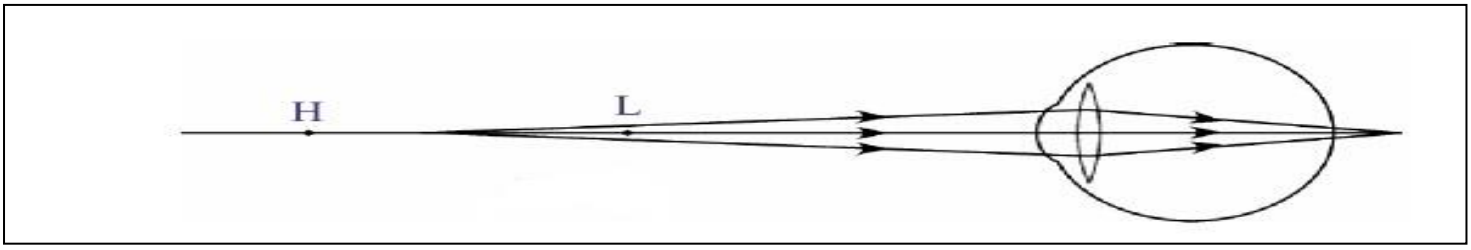


fig-5(e)

2. Explain the correction of the eye defect Hypermetropia. (AS1)

Ans: Some people cannot see objects at near distances but can see distant objects clearly. This type of defect in vision is called"Hypermetropia"

- It is also called "Far sightedness"
- If person suffering from hypermetropia ,his maximum focal length is more than 2.27cm
- If person suffering from hypermetropia , form an image beyond the retina



- The point of minimum distance at which the eye lens can form an image on the retina is called "near point(H)"
- A person with hypermetropia can see objects clearly after near point. Cannot see the objects clearly between Least distance of distinct vision(L) and near point(H)
- To correct this myopia by using bi-convex lens
- Focal length of bi-concave lens is f = 25d/(d-25)

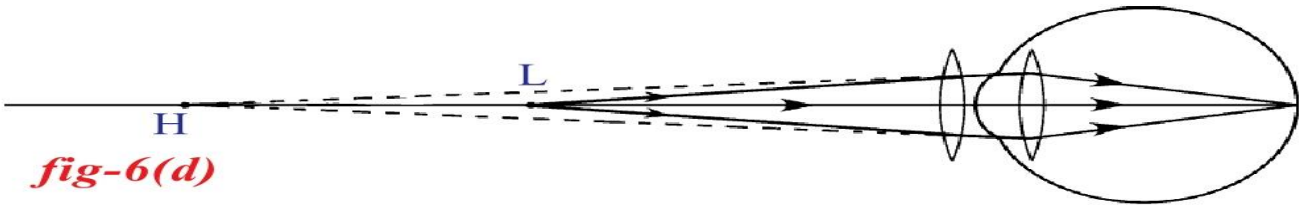


fig-6(d)

➢ **2 Marks Questions**

1. Define power of lens and write their unit (AS1)

Ans: The reciprocal of focal length is called power of lens. The unit of power is dioptre.

2. How many types of eye defects ? What are they? (AS1)

Ans: There are mainly three common defects of vision

1. Myopia 2. Hypermetropia 3. Presbyopia

3. "A doctor advised to Ravi to use -2D lens for his effect". Based on this Information answer the questions given below. (AS4)

a) Identify the eye defect of Ravi b)Find the focal length of lens. (OR)

A boy who is suffering from eye defect has been given a prescription as -2D. Based on the information given, answer the following questions

a) Identify the eye defect he is suffering b) Write the nature and focal length of the lens

Ans: a) Myopia b) f = 100/-2= -50 cm (concave lens)

4. Ammalu can see the name boards of Buses clearly from long distance. But she cannot read newspaper clearly.(AS2)

i) What type of eye defects does Ammalu have?

ii) What kind of lens does Ammalu use to correct her eye defect?

Ans: i) Hypermetropia ii) Bi convex lens

➢ **1 Mark Questions**

1. How do you correct the defect Presbyopia? (AS1)

Ans: by using bi-focal lens

2. Give the values of maximum and minimum focal length of eye lens ? (or) What are the limits to change the focal length of eye lens? (AS1)

Ans: Maximum focal length is 2.5cm and Minimum focal length is 2.27cm

3. A person is suffering from myopia, his far distance is 5 m. what is the focal length of his eye lens (AS2)

Ans: f = -D

= -5 m

3. Define angle of vision (AS1)

Ans: The maximum angle, at which we are able to see the whole object is called angle of vision.

➢ **½ Mark Questions**

1. What is the maximum focal length of the human eye lens?

Ans: 2.5cm

2. Matching

X) Least distance of distinct vision ( ) P) 25 cm

Y) Angle of vision ( ) Q) 30 cm

( ) R) 60^0

Ans: X-P, Y-R

3. Doctors use biconvex lens to treat which eye defect? (or) A person is advised to wear spectacles with convex lens. What type of defect of vision is he suffering from?

Ans: Hypermetropia

4. Match the following

Section-A	Section-B
1. Myopia	a) Convex lens
2. Hypermetropia	b) Vision defect with age
3. Presbyopia	c) Concave lens

Ans: 1-c, 2-a, 3-b

5. What is the value of least distance of distinct vision for healthy human being?
Ans: 25cm
6. What is the value of angle of vision for healthy human being?
Ans: 60^0
7. Write SI unit of power of lens
Ans: dioptre

Chapter-6 (STRUCTURE OF ATOM)

- **4 Marks Questions**

1. Explain the significance of three Quantum numbers in predicting the positions of an electron in an atom.(AS1)
Ans: Each electron in an atom is described by a set of three numbers n, l, and ml .These numbers are called quantum numbers.

1. Principal Quantum Number (n)

- The principal quantum number is related to the size and energy of the main shell and it is denoted by n.
- 'n' has positive integer values of 1, 2, 3,...
- As 'n' increases, the shells become larger and the electrons in those shells are farther from the nucleus.

Shell	K	L	M	N
n	1	2	3	4

2. The angular - momentum quantum number (*l*)

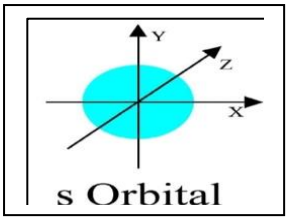
- The angular momentum quantum number '*l*' has integer values from 0 to n-1 for each value of 'n'.
- Each '*l*' value represents one sub-shell.
- Each value of '*l*' is related to the shape of a particular sub-shell in the space around the nucleus.
- The value of '*l*' for a particular sub-shell is generally designated by the letters s, p, d . . . as follows:

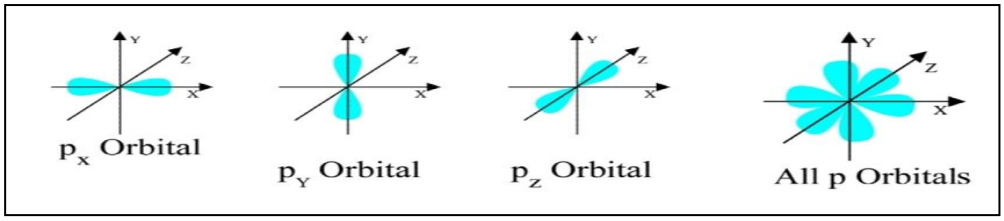
l	0	1	2	3
Name of the sub-shell	s	p	d	f

3. The magnetic quantum number (m_l)

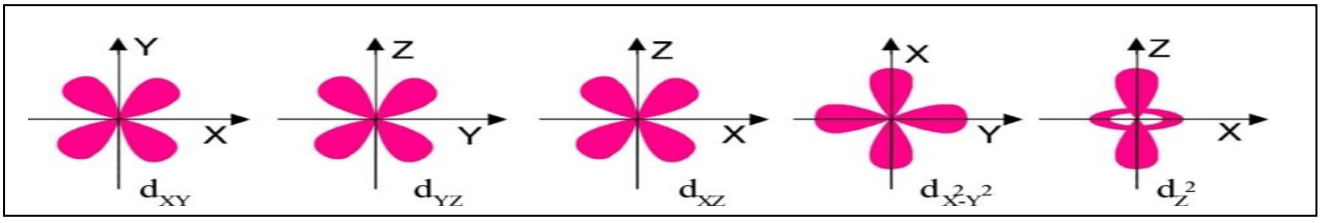
- The magnetic quantum number (m_l) has integer values between -l and l, including zero. Thus for a certain value of l, there are ($2l$ +1) integer values of ml as follows:
  -l, (-l+1) . . ., –1, 0, 1, . . . (+l - 1), +l
- These values describe the orientation of the orbital in space relative to the other orbitals in the atom.
- The number of 'm_l' values indicates the number of orbitals in a sub-shell with a particular *l* value

2. Draw the shapes of s and p orbitals (AS5)
Ans:





3. Draw the shapes of d-orbitals (AS5)
Ans:



4. State and explain with one example of Aufbau principle? (AS1)
Ans: The lowest-energy orbitals are filled first.
Two general rules help us to predict electronic configurations.
1. Electrons are assigned to orbitals in order of increasing value of (n+*l*).
2. For sub-shells with the same value of (n+*l*), electrons are assigned first to the sub-shell with lower 'n'.
Ex: In Scandium(Z=21), first twenty electrons can be accommodated in 1s,2s,2p,3s,3p and 4s orbitals.The last electron can enter into either 3d or 4p orbital

Orbital	(n+*l*) value
3d	3+2=5
4p	4+1=5

Both orbitals have (n+*l*) value. But 3d orbital is least "n" value. So last electron enter into 3d orbital.

- **2 Marks Questions**

1. Write the four quantum numbers for $1s^1$ electron (AS2)
Ans: n=1, *l=0*, m_l=*0*, m_s=+1/2
2. An element is an atom has the following set of four quantum numbers (AS4)

n	*l*	m_l	m_s
2	0	0	+1/2

i) Name of the element ii) Which orbital it belong to
Ans: i) Lithium ii) 2s
3. State and explain Pauli's exclusion principle? (AS1)
Ans: According to Pauli Exclusion Principle no two electrons of the same atom can have all four quantum numbers the same.
Ex: The electronic configuration of Helium(Z=2) is $1s^2$

Electron	n	*l*	m_l	m_s
1st	1	0	0	+1/2
2nd	1	0	0	-1/2

We observe that three quantum numbers are equal but fourth one is different
4. What is nl^x method? How it is useful? (AS1)
Ans: The shorthand notation consists of the principal energy level (n value),the letter representing sub-level (*l* value), and the number of electrons (x) in the sub-shell is written as a superscript as shown **nl^x.**

Useful of nl^x method:

1. To write the electronic configuration of an atom.
2. To find the position of electrons around the nucleus in an atom.

5. Complete the table (AS4)

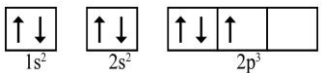
n Value	1		3	
Shell		L		N

Ans:

n Value	1	2	3	4
Shell	K	L	M	N

- **1 Mark Questions**

1. Which rule is violated in the electric configuration $1s^0 2s^2 2p^4$? (AS1)
Ans: Aufbau Principle
2. What is shape of d-orbital? (AS1)
Ans: Double dumbell
3. Which quantum number gives size and energy of the main shell? (AS1)
Ans: Principal quantum number
4. Which rule is violated in the following electronic configuration? (AS1)



Ans: Hund's rule

5. Which rule provides the information that maximum number of electrons filled in an orbital is 2 (AS1)

Ans: Pauli Exclusion Principle

- **½ Mark Questions**

1. Which electronic shell is at a higher energy level K or L ?

Ans: L

2. L-shell : 8 : : M-shell : ☐

Ans: 18

3. The '*l*' of value of p orbital is _____

A) 0 B) 1 C) 2 D) 3

Ans: B

4. (n+*l*) value of 3d orbital is_____

Ans: (3+2)=5

5. The shape of p-orbital is_____

A) Spherical B) Dumbell C) Double dumbell D) Double spherical

Ans: B

6. The arrangement of electrons in shells,sub-shells and orbitals of an atom is called _____

Ans: Electronic configuration

7. How many values can '*l*' have for n=4?

Ans: 4

Chapter-7 (CLASSIFICATION OF ELEMENTS –THE PERIODIC TABLE)

- **4 Marks Questions**

1. Discuss the construction of the long form of the periodic table.(AS1)

Ans: 1. Based on the modern periodic law, this modern periodic table is proposed.
2. The modern periodic table has 18 vertical columns known as Groups and 7 horizontal rows known as Periods.
3. 18 groups represented by using Roman numeral I through VIII with letters A and B in traditional notation or 1 to 18 Arabic numerals.
4. 7 periods represented by 1 to 7 Arabic numerals.
5. 1st period contains 2 elements, 2nd and 3rd periods contains 8 elements each, 4th and 5th periods contains 18 elements each, 6th period contains 32 elements and 7th periods is incomplete.
6. The elements are classified as s,p,d and f block elements.
7. Inert or Noble or Rare gases elements are placed in 18th group.
8. Each period starting with metal and ending with inert gas.
9. Left side elements are metals and right side elements are non-metals.
10. s and p block elements are known as Representative elements.
11. d-block elements are called Transition elements.
12. f-block elements are called Inner transition elements.
13. f-block elements(lanthannoids and Actinoids) are placed separately at the bottom of the table.

2. Explain how the elements are classified into s,p,d and f-block elements in the periodic table (AS1)

Ans: Based upon the electronic configuration the modern periodic table is divided into s, p, d and f- block elements.

S- Block elements:

1. The valence electrons enter into s-orbital is called s- block elements.
2. The elements of group IA and IIA belongs to s-block
3. Except hydrogen, all are metals

P- Block elements:

1. The valence electron enter into p-orbital is called p-block elements.
2. The elements of group IIIA and VIIIA belongs to p-block
3. Metals, non-metals and metalloids

d- Block elements:

1. The valence electron enter into d- orbital is called d-block elements.
2. The elements of group IB and VIIIB belongs to d-block
3. All are metals

f- Block elements:

1. The elements in which the last electron enters the f-orbital of their outer most energy level is called f-block elements.
2. Lanthanoids and Actinoids are f-block elements

3. Given below is the electronic configuration of elements A, B, C, D. (AS4)

A. $1s^2\ 2s^2$
B. $1s^2\ 2s^2\ 2p^6\ 3s^2$
C. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$
D. $1s^2\ 2s^2\ 2p^6$

1) Which are the elements coming within the same period?
2) Which are the elements are coming within the same group?
3) Which are the noble gas elements?
4) To which group and period does the element C belongs?

Ans: 1) A and D
2) A and B
3) D
4) 3^{rd} Period and VA or 15 Group

4. Write down the characteristics of element having atomic number 17. (AS4)

1) Electronic configuration _____
2) Period number _____
3) Group number _____
4) Element family _____
5) No.of valence electrons _____
6) Valency _____
7) Metal or non metal _____

Ans: 1) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$
2) 3
3) VIIA or 17
4) Halogen
5) 7
6) 1
7) Non-metal

- **2 Marks Questions**

1. Define "Dobereiner's law of traids" and give one example (AS1)

Ans: A group of three elements in which atomic weights, the atomic weight of the middle element is the average of the atomic weights of the first and third elements. This statement is called the Dobereiner's law of triads.

Ex: Li,Na,K

2. An element X belongs to 3rd period and group 2 of the period table. State
a) The number of valency b) The valency c) Whether it is metal or a nonmetal (AS2)

Ans: Element is Mg. Electronic configuration of Mg(Z=12)- $1s^2\ 2s^2\ 2p^6\ 3s^2$
a) 2
b) 2
c) Metal

- **1 Mark Questions**

1. Define the modern periodic law (AS1)

Ans: "The physical and chemical properties of elements are the periodic functions of the electronic configurations of their atoms."

2. An element has atomic number 19. Where would you expect this element in the periodic table (AS2)

Ans: The element with atomic number 19 is in 4^{th} period and 1^{st} group of the periodic table

3. State Mendeleeff's periodic law (AS1)

Ans: "The physical and chemical properties of the elements are the periodic functions of their atomic weights"

4. What is Newland law of octaves?

Ans: The law of octaves states that when elements are arranged in the ascending order of their atomic weights they fall into a pattern in which their properties repeat at regular intervals. Every eighth element starting from a given element resembles in its properties to that of the starting element.

5. Using the periodic table, predict the formula of compound formed between an element X of group 13 and another element Y of group 16. (AS2)

Ans: X_2Y_3

- **½ Mark Questions**

1. Lithium, _____ and Potassium constitute a Dobereiner's traid

Ans: Sodium

2. Number of elements present in period-2 of the long form of periodic table

A) 2 B) 8 C) 18 D) 32

Ans: 8

3. Group of elements is also called _____

Ans: element family or chemical family

4. Matching

A) Group-1 ( ) X) Halogens

B) Group -18 ( ) Y) Alkali metals

Z) Noble gases

Ans: A-Y, B-Z

5. Lanthanoids : 4f : : _____ : 5f

Ans: Actinoids

6. The first attempt classification of elements was made by _____

Ans: Dobereiner

7. The incomplete period of the periodic table is _____

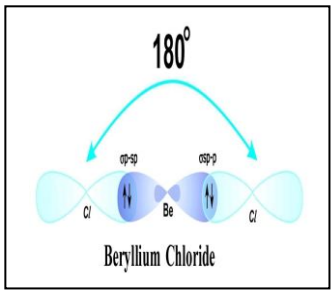
Ans: 7

Chapter-8 (CHEMICAL BOND)

- **4 Marks Questions**

1. Explain the formation of $BeCl_2$ molecule using hybridization.(AS1)

Ans: Formation of $BeCl_2$:-



a) Be(z=4) has electronic configuration $1s^2 2s^2$

b) It has no unpaired electrons

c) It is suggested that excited Be atom in which an electron from 2s shifts to $2p_x$ level.

d) The excited electronic configuration of Be is $1s^2\ 2s^1\ 2p^1{}_x$

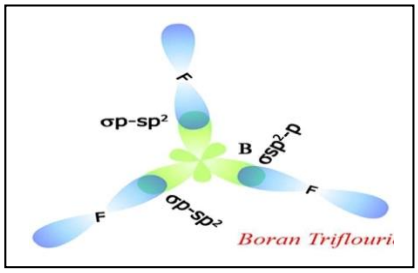
e) Electronic configuration of Cl(z=17) is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^2{}_x\ 3p^2{}_y\ 3p^1{}_z$

f) If Be forms two covalent bonds with two Chlorine atoms, one bond should be σ2s-3p due to the overlap of 2s orbital of Be, the $3p_z$ orbital of one Chlorine atom.

g) The other bond should be σ2s-3p due to the overlap of $2p_x$ orbital of Be atom the 3p orbital of the other Chlorine atom and bond angle is 180^0

2. Explain the formation of BF_3 molecule using hybridization.(AS1)

Ans: Formation of BF_3:-



a) B(z=5) has electronic configuration $1s^2\ 2s^2\ 2p^1{}_x$

b) The excited electronic configuration of B is $1s^2\ 2s^1\ 2p^1{}_x 2p^1{}_y$

c) As it forms three identical B-F bonds in BF_3

d) It is suggested that excited B atom undergoes hybridization.

e) There is an intermixing of 2s, $2p_x$, $2p_y$ orbitals and their redistribution into three identical orbitals called sp^2 hybrid orbitals

f) For three sp^2 orbitals to get separated to have minimum repulsion the angle between any two orbitals is 120^0 at the central atom.

g) Now three fluorine atoms overlap their $2p_z$ orbitals containing unpaired electrons. [F (z=9) $1s^2 2s^2 2p^2{}_x 2p^2{}_y 2p^1{}_z$] the three sp^2 orbitals of B that contain unpaired electrons to form three σsp^2-p bonds.

3. Explain how formation of sodium chloride on the basis of the concept of electron

transfer from one atom to another atom.(AS1)

Ans: Formation of sodium chloride (NaCl):

NaCl is formed from the elements Na and Cl

Cation formation: When Sodium atom loses one electron to get octet electron configuration

$Na \longrightarrow Na^+ + e^-$

(2,8,1) (2,8)

Anion formation: Chlorine atom to gain one electron from the sodium atom and get the octet electron configuration.

$Cl + e^- \longrightarrow Cl^-$

(2,8,7) (2,8,8)

Formation of NaCl: These oppositely charged ions get attracted towards each other due to electrostatic forces and form the NaCl compound.

$Na^+ + Cl^- \longrightarrow NaCl$

- **2 Marks Questions**

1. Define hybridization (AS1)

Ans: Hybridisation is a phenomenon of intermixing of atomic orbitals of almost equal energy which are present in the outer shells of the atom and their reshuffling or redistribution into the same number of orbitals but with equal properties like energy and shape.

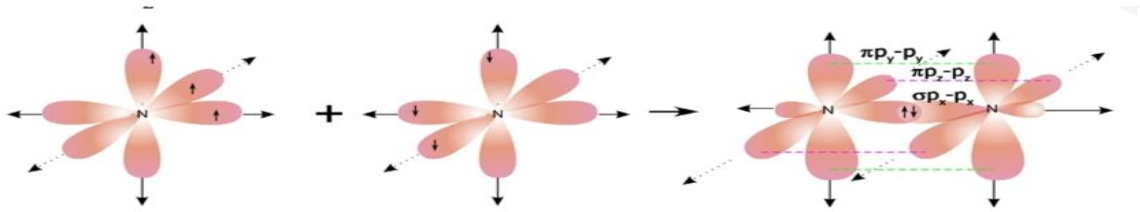
2. Explain the formation of N_2 molecule (AS1)

Ans: 1. $_7N$ has electronic configuration $1s^2\ 2s^2\ 2px^1\ 2py^1\ 2pz^1$.

2. The p_x orbital of one 'N' atom overlaps the 'p_x' orbital of the other 'N' atom giving σ $p_x - p_x$ bond along the inter-nuclear axis.

3. The p_y and p_z orbitals of one 'N'atom overlap the p_y and p_z orbital of other 'N' atom laterally, respectively perpendicular to inter-nuclear axis giving πp_y-p_y and πp_z-p_z bonds.

4. Therefore, N_2 molecule has a triple bond between two nitrogen atoms.



3. Explain the formation of O_2 molecule (AS1)

Ans: Formation of O_2 molecule (Double Bond)

1. $_8O$ has electronic configuration $1s^2\ 2s^2\ 2px^2\ 2py^1\ 2pz^1$.
2. The 'p_y' orbital of one 'O' atom overlaps the 'p_y' orbital of other 'O' atom along the Internuclear axis, a sigma p_y- p_y bond (σp_y- p_y) is formed.
3. p_z orbital of one 'O'atom overlaps the p_z orbital of other 'O' atom laterally, perpendicular to the inter-nuclear axis giving a πp_z- p_z bond.
4. O_2 molecule has a double bond between two oxygen atoms.

4. Write electronic configurations of a) Na^+ b) Cl^- (AS1)

Ans: a) Na^+ - $1s^2\ 2s^2\ 2p^6$

b) Cl^- -$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^8$

- **1 Mark Questions**

1. Define octet rule (AS1)

Ans: The tendency of atoms to achieve eight electrons in their outermost shell is known as Octet rule

2. Define chemical bond (AS1)

Ans: The force between any two atoms or a group of atoms that results in the formation of a stable entity is called chemical bond

3. What are valence electrons? (AS1)

Ans: The electrons are present in outer most shell is called as valence electrons

4. Draw electron dot structure for Ne (AS5)

Ans: :Ne:

5. Define covalent bond (AS1)

Ans: A chemical bond that formed by sharing of valence-shell electrons between the atoms so that both of them can attain octet or duplet in their valence shell is called covalent bond.

6. Define ionic bond (AS1)

Ans: The electrostatic attractive force that keeps cation and anion together to form a new electrically neutral entity is called an ionic bond.

➢ **½ Mark Questions**

1. Match the suitable answers of section-B with section-A

Section-A	Section-B
X) N_2	P) 120^0
Y) BF_3	Q) 180^0
	R) 3 bonds

Ans: X-R, Y-P

2. What type of hybridization is present in BF_3 molecule?

Ans: sp^2

3. Bond angle of $BeCl_2$ is ___

A) 120^0 B) 109^028^1 C) 180^0 D) 104^031^1

Ans: C

4. What is shape of BF_3 molecule?

Ans: Trigonal planar

Chapter-9 (ELECTRIC CURRENT)

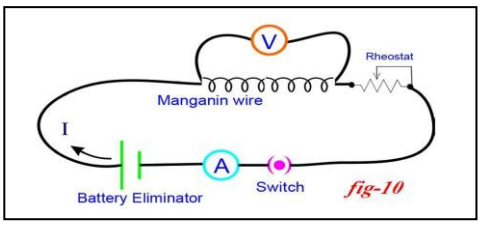
➢ **4 Marks Questions**

1. State Ohm's law. Suggest an experiment to verify it and explain the procedure. (AS3)

Ans: Ohm's law: The potential difference between the ends of a conductor is directly proportional to the electric current passing through it at constant temperature

Aim: To show that the ratio V/I is a constant for a conductor.

Materials required: 6V battery eliminator, 0 to 1A ammeter, 0-6V volt meter, copper wires, 50cm
manganin coil, Rheostat, switch



Procedure:

1.Complete the circuit as shown in the figure.
2.By using Rheostat adjust the potential difference1V between two ends of manganin wire.
3. Now observe the electric current through ammeter in the circuit.
4. Using Rheostat change the potential difference with different values upto 4.5V and note down atleast five values of V and I in the table.
5.

Sl.No.	Potential	Current	V/I

We can conclude that the ratio of V/I is constant for a conductor

2. Define the following terms (AS1)

A) Electric current B) Resistance

Ans: A) The amount of charge crossing any cross section of the conductor in one second.

Electric current = electric charge/time interval

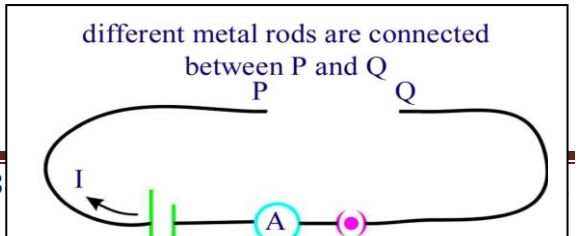
Formula: $I = Q/t$

B) Resistance: The obstruction to the motion of the motion of the electros in a conductor.

3. How do you verify that resistance of a conductor is proportional to the length of the conductor for constant cross section area and temperature (AS3)

Ans:

1.Collect manganin wires of different lengths with the same cross sectional areas.
2. Make a circuit as shown in figure.
3.Connect one of the manganin wires, say 10cm length, between P and Q.



4. Measure the value of the current using the ammeter connected to the circuit.
5. Repeat this for other lengths of the wires.
6. Note corresponding values of currents.
7. We can conclude that the resistance (R) of a conductor is directly proportional to its length (l)for a constant potential difference.

4. Observe the table and answer the following questions (AS4)

Material	$\rho_{(\Omega\text{-m})}$ at 20 °C
Silver	1.59×10^{-8}
Copper	1.68×10^{-8}
Gold	2.44×10^{-8}
Aluminium	2.82×10^{-8}
Calcium	3.36×10^{-8}
Tungsten	5.60×10^{-8}
Zinc	5.90×10^{-8}
Nickel	6.99×10^{-8}
Iron	1.00×10^{-7}
Lead	2.20×10^{-7}
Nichrome	1.10×10^{-6}
Carbon (Graphite)	2.50×10^{-6}
Germanium	4.60×10^{-1}
Drinking water	2.00×10^{-1}
Silicon	6.40×10^{2}
Wet wood	1.00×10^{3}
Glass	10.0×10^{10}
Rubber	1.00×10^{13}
Air	1.30×10^{16}

a) On what factors does the resistivity of material depends?
Ans: Temperature and nature of the material
b) Write the SI unit of resistivity
Ans: Ω-m
c) Name the material which acts as best conductor?
Ans: Silver
d) Name the material which is used to make of filament in the electric lamp?
Ans: Tungsten
e) Name the material which is used to make the heating elements of irons,toasters ?
Ans: Nichrome
f) Name the materials which are used to make diodes, transistors and integrated circuits?
Ans: Germanium and Silicon
g) Name the two factors on which the resistivity of a substance does not depend?
Ans: Length and cross section of the conductor
h) Write the equation to show the relation between resistance and resistivity of the material?
Ans: $R = \rho l/A$

5. Derive $R= \rho l/A$ (AS1)

Ans: The resistance of a conductor is directly proportional to its length
[at A and T are constant]

$$R \propto l \quad \ldots\ldots\ldots(1)$$

The resistance of a conductor is inversely proportional to its cross section area
[at L and T are constant]

$$R \propto 1/A \quad \ldots\ldots\ldots(2)$$

From (1) and (2) equations

$$R \propto l/A$$

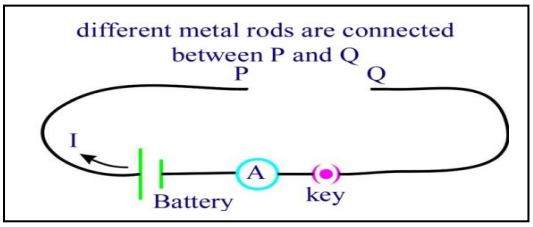
$$R = \rho\, l/A$$

Where ρ is specific resistance or resistivity

6. Prove resistance is inversely proportional to area of cross section for constant length and Temperature

Ans:

Activity:



1. Collect manganin wires of equal lengths but different cross sectional areas.
2. Make a circuit as shown in figure.
3. Connect one of the wires between points P and Q.
4. Note the value of the current using the ammeter connected to the circuit
5. Repeat this with other wires.
6. Note the corresponding values of currents in each case.
7. we conclude that the resistance of a conductor is inversely proportional to its cross section area

7. How can you verify that the resistance of a conductor is temperature dependent?

Ans:

Activity:

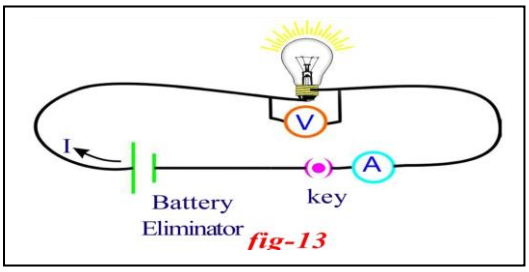


fig-13

1. Complete the circuit as shown in the figure.
2. Adjust the knob to keep the potential difference at 1.5V in the battery eliminator.
3. Now run the circuit and note down the Ammeter reading in the table. Now touch the bulb and sense the heat.
4. Similarly repeat the experiment with 3V, 4.5V, 6V and note down V and I values in the table.

Sl.No	Potential	Current	V/I

5. We conclude that the temperature of the conductor is increases than resistance also increases.

➢ **2 Marks Questions**

1. Write the materials required to conduct ohm's law verification experimentally (AS3)

Ans: 6V battery eliminator, 0 to 1A ammeter, 0-6V volt meter, copper wires, 50cm manganin coil, Rheostat, switch

2. Give examples for Ohmic conductors and non Ohmic materials. (AS1)

Ans: Example of Ohmic materials- Metals
Example of Non Ohmic materials- LEDs

3. Define Resistivity of a conductor ? (AS1)

Ans: The resistance per unit length of a unit cross section of the material is called resistivity.

4. What are the limitations of Ohm's (AS1)

Ans: 1. Ohm's law is valid for metal conductors.
2. Ohm's law is not applicable to gaseous conductors.
3. Ohm's law is not applicable to semi conductors.

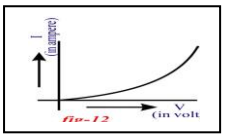
➢ **1 Mark Questions**

1. What are factors which affect the resistance of a material? (AS1)

Ans: Temperature, Nature of material, Length and Cross section area of the conductor

2. Draw the shape of V-I graph of Non-ohmic conductor.(AS5)

Ans:



3. Define emf ?(AS1)

Ans: emf is defined as the work done by the chemical force to move unit positive charge from negative terminal to positive terminal of the battery

4. On what factors does the resistivity depend? (AS1)

Ans: Temperature and nature of the material

4. Define "Potential difference" (AS1)

Ans: Work done by the electric force on unit positive charge to move it through a distance is called potential difference between those points.

5. Why do tungsten is used in filament? (AS2)

Ans: Tungsten has higher resistivity value and high melting point

- **½ Mark Questions**

1. What is the shape of V-I graph of ohmic conductor?

Ans: straight line

2. joule/coulomb is the same as

A) watt B) volt C) ampere D) ohm

Ans: B

3. Match the following

(X) 1 Ohm (P) 1 Colounb / 1 sec

(Y) 1 Ampere (Q) 1 Watt / 1 sec

(R) 1 Volt / 1 Ampere

(A) X-Q, Y-P, (B) X-R, Y-P (C) X-Q, Y-R (D) X-R,Y-Q

Ans: B

4. What happens to the resistance of a conductor, if we increase its length?

Ans: Increase

5. 1V/ 1A = _____

Ans: 1Ω

6. Matching

A) Potential difference ( ) X) volt

B) emf ( ) Y) ampere

Z) ohm

Ans: A-X, Y-X

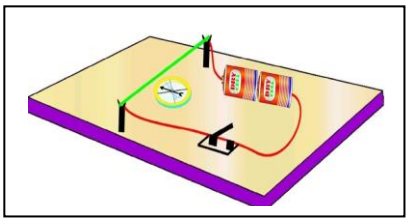
7. The S.I unit of resistivity is _____

Ans: ohm-meter or Ω-m

Chapter-10 (ELECTROMAGNETISM)

- **4 Marks Questions**

1. How can you verify that a current carrying wire produces a magnetic field with the help of experiment? (AS3)



Ans: i)Take a thermocole sheet and fix two thin wooden sticks of height 1cm which have small slit at the top of their ends.

ii)Arrange a copper wire of 24gauge so that it passes through these slits and make a circuit.

iii)The circuit consists of a 3 (or 9) volt battery, key and copper wire which are connected in series as shown in figure.

iv) Now, keep a magnetic compass below the wire. Bring a bar magnet close to the compass.

v) The needle in the compass deflects. This deflection is due to magnetic field produced by bar magnet.

vi) Take the bar magnet far away from the circuit and switch on the circuit. Observe the changes in compass.

vii) The compass needle deflects.

viii) This deflection is due to the magnetic field produced by current carrying wire.

- **2 Marks Questions**

1. Write the materials required to conduct Oersted experiment (AS3)

Ans: Thermocole sheet, two thin wooden sticks, 24 gauge copper wire, 3 or 9 V battery, copper wire switch, magnetic compass, bar magnet

2. Rajkumar said to you that the magnetic field lines are open and they start at north pole of bar magnet and end at south pole. What questions do you ask Rajkumar to correct him by saying " field lines are closed" ? (AS2)

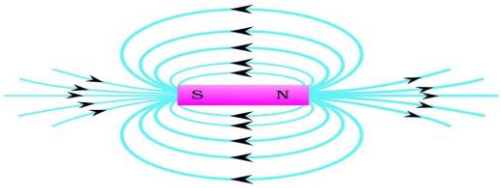
Ans: i) What is the direction of field lines outside of the bar magnet?

ii) What is the direction of field lines inside the bar magnet?

iii) Are the magnetic lines are straight lines or curved lines?
iv) Does magnetic field lines have direction?

3. Draw magnetic field lines (AS5)

Ans:



- **1 Mark Questions**

1. What is the flux through the plane taken parallel to the field? (AS2)

Ans: Zero

2. Define Magnetic flux (AS1)

Ans: The number of lines passing through the plane of area 'A' perpendicular to the field is called magnetic flux.

3. Define magnetic flux density (AS1)

Ans: The magnetic flux passing through unit area taken perpendicular to the field is known as magnetic flux density or magnetic field induction.

4. What is magnetic field? (AS1)

Ans: The area around a magnet where a magnetic force is experienced is called the magnetic field.

- **½ Mark Questions**

1. weber/metre^2 =

A) Oersted B) Tesla C) Newton D) Watt

Ans: B

2. Write the formula of magnetic flux density.

Ans: B = Φ/A

3. Magnetic field is

A) one dimensional B) two dimensional C) three dimensional D) n-dimensional

Ans: C

4. Matching

A) Magnetic flux ( ) X) Tesla
B) Magnetic flux density ( ) Y) Weber
Z) Weber/metre^2

Ans: A-Y, B-X,Y

Chapter-11 (PRINCIPLES OF METALLURGY)

- **4 Marks Questions**

1. Suggest an experiment to prove that the presence of air and water is essential for corrosion.Explain the procedure (AS3)

Ans:

Aim:- To prove that the presence of air and water are essential occurrences of corrosion.

Apparatus:- Three test tubes, three corks, Distilled water, anhydrous calcium chloride, clean iron nails and oil etc.

Procedure:-

1.Take 3 test tubes and place clean iron nails in each of them.Label the test tubes A, B and C
2. Pour some water in test tube A and cork it.
3. Pour boiled distilled water in test tube B, and about 1ml of oil and cork it.
4. Put some anhydrous calcium chloride in test tube C and cork it.
5. Leave these test tubes for a few days and then observe.
6. After a few days, we will observe that iron nails rust in test tube A, but they do not rust in test tubes B and C.

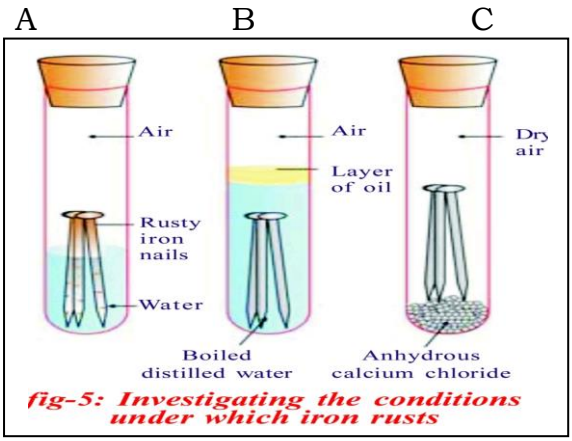


fig-5: Investigating the conditions under which iron rusts

Conclusion:- From the above experiment, we can prove that air and water are essential for corrosion.

- **2 Marks Questions**

1. Define a) Mineral b) Ore (AS1)

Ans: a) A metallic compound occurring in the earth crust along with impurities is called mineral. (or) The elements or compounds of the metals which occur in nature in the earth crust are called minerals.

b) A mineral from which a metal can be extracted economically and conveniently is called ore.

2. Complete the table (AS4)

Ore	Formula	Metal	Form
Magnesite			
	MnO_2		
		Silver	

Ans:

Ore	Formula	Metal	Form
Magnesite	$MgCO_3$	Magnesium	Carbonate
Pyrolusite	MnO_2	Manganese	Oxide
Horn Silver	$AgCl$	Silver	Chloride

- **1 Mark Questions**

1. Mention any one of methods of prevention of corrosion (AS1)

Ans: Painting or electroplating

2. What is the name of the process of extraction of metals from their ores? (AS1)

Ans: Metallurgy

3. What is gangue ? (AS1)

Ans: The impurity present in the ore is called gangue

4. What is corrosion? (AS1)

Ans: Corrosion is a natural process, which converts a refined metal to a more chemically stable form

- **½ Mark Questions**

1. The impurity present in the ore is called as_____

A) Gangue B) Flux C) Slag D) Mineral

Ans: A

2. Name the phenomenon where in a metal such as iron is damage when exposed to moist air for a long time?

Ans: corrosion

3. The most abundant metal in the earth's crust is ?

A) Sliver B) Aluminum C) Gold D) Iron

Ans: B

4. Bauxite is an ore of _____

Ans: Aluminium

Chapter-12 (CARBON AND ITS COMPOUND)

➢ 4 Marks Questions

1. Observe the table and answer the following questions (AS4)

Alkane	Methane	Ethane	Propane	Butane
Molecular formula	CH_4	C_2H_6	C_3H_8	C_4H_{10}

a) What is the general formula of Alkanes?
Ans: C_nH_{2n+2}

b) Write the molecular formula of next alkane comes after Butane?
Ans: C_5H_{12}

c) How many carbons in Pentane?
Ans: 5

d) How many bonds present in Methane?
Ans: 4

2. What are the differences between Alkanes, Alkenes and Alkynes (AS1)

Ans:

Alkanes	Alkenes	Alkynes
1.General formula is C_nH_{2n+2}	1. General formula is $C_n H_{2n}$	1. General formula is $C_n H_{2n-2}$
2.Saturated hydrocarbons	2.Unsaturated hydrocarbons	2. Unsaturated hydrocarbons
3.All C-C bonds	3.Atleast one C=C bond	3.Atleast one C≡C
4. They undergo substitution reactions	4. They undergo addition reactions	4. They undergo addition reactions
5.Simplest Alkane is CH_4	5.Simplest Alkene is C_2H_4	5.Simplest Alkyne is C_2H_2

➢ 2 Marks Questions

1. What is "catenation" (AS1)

Ans: If any element forms bonds between its own atoms to give big molecules we call that property as catenation property.

2. Name the following hydrocarbons (AS2)

a) C_2H_4 b) C_2H_2

Ans: a) Ethene or Ethylene b) Ethyne or Acetylene

3. What is the specialty of Carbon? (AS1)

Ans: 1) to form largest number of compounds 2) to show catenation
3) to form various types of bonds made it the versatile element.

➢ 1 Mark Questions

1. Write the general formula of Alkenes? (AS1)

Ans: C_nH_{2n}

2. What do we call the self linking property of carbon? (AS1)

Ans: Catenation

➢ ½ Mark Questions

1. Name the simplest hydrocarbon?

Ans: Methane

2. Write the electronic configuration of carbon atom.

Ans: $1s^2 2s^2 2p^2$ (or) $1s^2 2s^2 2p_x^1 2p_y^1$

3. Atomic number of carbon is _____

Ans: 6

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